

## CLAIMS

1. A brazing apparatus for brazing together work pieces comprising:  
an electric connector for connecting to an electrical power source;  
at least two electrodes adapted for attaching to and providing electrical contact  
5 with the work pieces to be brazed together;  
means for converting the electric power being directed from the electrical power  
source into a low voltage, high electric current flow directed to the work pieces;  
and a control system for controlling the time duration of the brazing operation  
and for monitoring and controlling the brazing temperature being generated  
10 along the interface between the work pieces.
2. The brazing apparatus of Claim 1 further comprising means for permitting the  
user to manually control the time duration of the brazing operation.
- 15 3. The brazing apparatus of Claim 1 further comprising means for permitting the  
user to manually control the brazing temperature being generated along the  
interface between the work pieces.
- 20 4. The brazing apparatus of Claim 1 wherein said control system comprises a  
microprocessor for controlling the brazing operation.

5. The brazing apparatus of Claim 1 further comprising means for cooling the electrodes.

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6. The brazing apparatus of Claim 1 wherein said electrodes are water cooled electrodes.

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7. The brazing apparatus of Claim 1 further comprises a plurality of electrodes for positioning along the work pieces to provide a uniformed brazing temperature along the interface between the work pieces.

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8. A brazing apparatus for brazing together work pieces comprising:  
an electric connector for connecting to an electric power source for providing electric power;  
at least two electrodes adapted for attaching to and providing electrical contact with the work pieces to be brazed together;  
a device for converting the electric power into a low voltage, high amperage electric flow; and  
a control system for controlling the flow of electric power to the electrodes;  
wherein said control system includes a temperature sensor for monitoring and automatically regulating the temperature along the interface between the work pieces being brazed together.

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9. The brazing apparatus of Claim 8 further comprises means for adjusting the current level of the electric flow when the temperature along the interface between the work pieces exceeds a predefined level.
- 5 10. The brazing apparatus of Claim 8 further comprising means for permitting the user to manually control the time duration of the brazing operation.
11. The brazing apparatus of Claim 8 further comprising means for permitting the user to manually control the brazing temperature being generated along the interface between the work pieces.
- 10 12. The brazing apparatus of Claim 8 further comprising means for cooling the electrodes.
- 15 13. The brazing apparatus of Claim 8 wherein said electrodes are water cooled electrodes.
- 20 14. The brazing apparatus of Claim 8 wherein each said electrode includes a flow channel for receiving cooling fluid effective for minimizing heat buildup in the electrode.

15. The brazing apparatus of Claim 14 wherein the brazing apparatus further comprises means for increasing or decreasing the supply of cooling fluid to each electrode.
- 5 16. The brazing apparatus of Claim 8 further comprises a plurality of electrodes for positioning along the work pieces to provide a uniformed brazing temperature along the interface between the work pieces.
- 10 17. A method for brazing at least two work pieces together comprising the steps of:  
inserting a fusible material along the high resistance interface between the work pieces;  
defining a temperature level to be maintained along the interface during the brazing operation; and  
applying a low voltage, high electric current flow to rapidly heat the interface  
15 causing the fusible material to melt, then consolidate and cool to form a brazed joint;  
wherein the temperature along the interface is regulated by increasing or decreasing the current flow to maintain the temperature at the predefined level.
- 20 18. The method for brazing of Claim 17 further comprising the step of terminating the brazing operation after a predefined time.

19. The method of brazing of Claim 17 further comprising the step of applying a plurality of electrodes at various points along the work pieces and regulating the electric current flow to each electrode to provide the defined temperature level along the interface between the work pieces.

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20. The method of brazing of claim 17 further comprising the step of cooling the electrodes.